**UNIT 3 VCE PE**

**OUTCOME 2 – PHYSIOLOGICAL RESPONSES TO PHYSICAL ACTIVITY**

**QUIZ**

**Instructions: You have 45 minutes to complete this quiz. This is a closed book assessment. Your mark will make up 10% of your final mark for Unit 3. There are 20 questions to answer.**

**Multiple Choice Questions.**

Circle the most appropriate answer. Each question is worth 1 mark.

**Q1.** The energy system interplay:

1. Occurs when all three energy systems supply energy for ATP resynthesis.
2. Calls upon the ATP-PC, then the lactic acid and lastly the aerobic system.
3. Occurs when all three energy systems are working independently to supply ATP.
4. None of the above.

**Q2.** Anaerobic glycolysis:

1. Uses both of the anaerobic systems.
2. Occurs in the absence of oxygen.
3. Releases 36 moles of ATP from each glucose molecule.
4. Can continue for up to 2-3 hours.

**Q3.** At rest, which body part receives most oxygen?

1. The brain
2. The muscles
3. The heart
4. None of the above

**Q4**. Oxygen debt:

1. Is also known as EPOC
2. Allows for PC to be replenished
3. Is when accumulated lactic acid is metabolised
4. All of the above

**Q5.** Which of the following athletes would have the highest VO2 Max?

1. Cross country skier
2. 1500m swimmer
3. Marathon runner
4. Decathlete

**Q6**. After being fully depleted, PC takes how long to be resynthesised?

1. 90 seconds
2. 120 seconds
3. 150 seconds
4. 180 seconds

**Q7.** Which muscle fibres are most resistant to muscle fatigue?

1. Slow oxidative
2. Fast oxidative
3. Slow glycolytic
4. Fast glycolytic

**Q8.** Glycogen depletion can be best avoided by consuming:

1. Low GI foods before an event
2. High GI foods before an event
3. Foods high in fats to conserve glycogen depletion before an event
4. Large quantities of carbohydrates the night before an event

**Q9.** High-protein diets are avoided by some athletes because proteins:

1. Requires more oxygen than fats and carbohydrates to resynthesise ATP.
2. Lead to displacement of carbohydrate-rich foods in diets
3. Are a ’last resort’ energy supply
4. Lead to absorption of water which makes athletes weigh more

**Q10**. Which one of the following events would lead to the greatest oxygen debt?

1. 100m sprint
2. Long jump
3. 200m sprint
4. Marathon

/10

**Short answer questions**

Q11. State 2 factors that distinguish anaerobic and aerobic glycolysis.

*Suitable responses include:*

1. *Anaerobic glycolysis occurs without the presence of oxygen while aerobic glycolysis occurs when sufficient oxygen is present.*
2. *Anaerobic glycolysis involves the incomplete breakdown of glycogen while glycogen is broken down fully in aerobic glycolysis.*
3. *Anaerobic glycolysis results in the production of lactic acid and ATP while aerobic glycolysis results only in the production of ATP.*
4. *Anaerobic glycolysis occurs under the conditions of high intensity activity (greater than 85%) while aerobic glycolysis occurs under conditions of moderate to low intensity activity (under 85% max).*

/2 marks

Q12. Indicate the specific sites where anaerobic and aerobic glycolysis occur.

*Anaerobic glycolysis occurs within the muscle cells while aerobic glycolysis occurs in the mitochondria. /2 marks*

Q13. Complete the following table, filling in the duration and intensity of effort, the fuels and whether oxygen is used for each energy system.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Main energy systems | Duration of effort | Intensity of effort | Food/chemical fuel(s) | Oxygen used (Y/N) |
| ATP-PC system | 10 seconds | Very High | PC | N |
| Lactic Acid system | Up to 3 mins | High | Glycogen | N |
| Aerobic system | 2 mins + | Low - med | Glycogen - fat | Y |

/12 marks

Q14.Which energy system is predominantly utilised by a cross country skier in a 15km race:

1. While waiting at the start? \_*Aerobic*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. In the first 100m? \_*ATP-PC*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Between 100m and 1000m? \_\_*Lactic Acid\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*
4. From 1000m to 1450m? \_\_\_\_*Aerobic*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. As he sprints the last 500m? \_*Aerobic*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

/5 marks

Q15. As we move from rest to the start of exercise, numerous physiological changes occur to supply more oxygen to working muscles.

1. List three immediate changes that take place in the cardiovascular system to facilitate this.
2. *increased heart rate*
3. *increased stroke volume*

*iii. increased cardiac output* /3 marks

1. What respiratory changes occur to increase oxygen consumption when exercising?

*Increased ventilation, inspiration, expiration, tidal volume, diffusion of oxygen from lungs to blood.*

/4 marks

Q16. Apart from fuel depletion, list three other factors that might contribute to fatigue at the end of a two hour run.

1. *dehydration*
2. *elevated body temperature*
3. *level of metabolic by products*
4. *Redistribution of blood flow to skin’s surface / away from working muscles to cool down.*

/3 marks

Q17. At an Olympic time trial for the women’s 400m hurdles, the following 100m split times were recorded:

|  |  |
| --- | --- |
| 100m split | Time |
| 1st 100m | 12.96 sec |
| 2nd 100m | 12.85 sec |
| 3rd 100m | 13.23 sec |
| 4th 100m | * 1. sec |

1. Splits 3 and 4 show slower times than splits 1 and 2. Explain this in terms of fatigue.

*Splits 3 and 4 would shower slower times than splits 1 and 2 due to depletion of PC ( fuel) and reliance on anaerobic glycolysis. Another factor in the fatigue is reduced rate of energy liberation presence of lactic acid inhibiting key enzymes.*

/2 marks

ii. Name two symptoms of fatigue that the hurdler would experience at the end of the 400m race.

*Symptoms of fatigue felt at the end of the race would be a heavy feeling in the legs and an increase in the rate and depth of breathing.*

/2 marks

iii. What is the main fuel relied on during the running of the 400m hurdles?

*The main fuel relied upon during the hurdles event is glycogen.* /1 mark

Q18. Identify two factors that contribute to oxygen uptake remaining elevated during the recovery phase.

Suitable responses include:

1. *There is a need for higher oxygen consumption as many of the biomechanical processes in in recovery require oxygen.*
2. *Processes such as restoration of PC, breakdown of lactic acid.*
3. *The secretion of the hormone epinephrine during exercise also keeps the levels elevated.*

/2 marks

Q19. Following a bout of physical activity, an athlete experiences a large oxygen debt. Explain what causes the size of the oxygen debt following activity.

*The size of the oxygen debt is proportional to the intensity and duration of the activity undertaken.*

/1 mark

Q20. Fats can provide more ATP than carbohydrates, yet they are not our preferred exercise fuel. Briefly discuss why.

*Fats are not our preferred exercise fuel because they require more chemical reactions to release energy than do carbohydrates (slower release) as well as requiring more oxygen to resynthesie ATP (less available to working muscles).*

/2 marks